Amendments to the Claims

Please cancel claims 15-30 and 33 without prejudice or disclaimer.

Please amend claims 34, 36 and 37 as indicated in the listing of claims.

The listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

Claims 1-33. (Canceled)

34. (Currently amended) The method of claim 36 ~~33~~, wherein the sample comprises a nucleic acid derivative.

35. (Original) The method of claim 34, further comprising identifying the nucleic acid derivative based on the analysis.

36. (Currently amended) A method comprising:

a) irradiating a sample containing a plurality of target molecules of interest in a resonance chamber having a reflector and a partial reflector;

b) selectively resonating inelastically scattered radiation ~~characteristic~~ of a first target molecule between the reflector and partial reflector within ~~in~~ the chamber to amplify the intensity of the resonating inelastically scattered radiation of the first target molecule;

c) transmitting the ~~selectively resonated~~ amplified inelastically scattered radiation of the first target molecule from the chamber;

d) detecting the transmitted amplified inelastically scattered radiation of the first target molecule;

e) selectively resonating inelastically scattered radiation ~~characteristic~~ of a second target molecule between the reflector and partial reflector within ~~in~~ the chamber to amplify the intensity of the resonating inelastically scattered radiation of the second target molecule;

f) transmitting the amplified inelastically scattered radiation of the second target molecule from the chamber;

g ~~f~~) detecting the transmitted amplified inelastically scattered radiation of the second target molecule; and

h g) optionally repeating e), ~~and~~ f) and g) for additional target molecules in the plurality of molecules.

37. (Currently amended) A method comprising:

a) irradiating a sample containing a set of molecules of interest in a resonance chamber having a reflector and a partial reflector;

b) ~~selectively~~ resonating inelastically scattered radiation characteristic of an average wavelength associated with the set of molecules between the reflector and partial reflector within ~~in~~ the chamber to amplify the intensity of the resonating inelastically scattered radiation;

c) transmitting the ~~selectively resonated~~ amplified inelastically scattered radiation from the chamber;

d) detecting the transmitted amplified inelastically scattered radiation; and

e) ~~optionally~~ identifying a particular derivative of the set of molecules of interest based upon detecting a derivative-specific frequency shift in the transmitted radiation.

38. (Previously presented) The method of claim 37, wherein the set of molecules of interest are a set of nucleotides.

39. (Previously presented) The method of claim 38, wherein the particular derivative is a specific nucleotide.

40. (New) The method of claim 36, further comprising irradiating the sample with radiation from a second source.

41. (New) The method of claim 40, wherein the radiation from the second source is a different frequency than the initial radiation.

42. (New) The method of claim 41, wherein the initial radiation is a seed radiation in a first direction and radiation from the second source is a transverse radiation in a second direction, the first direction being perpendicular to the second direction.

43. (New) The method of claim 42, wherein detecting the transmitted amplified inelastically scattered radiation includes detecting a gain over the intensity of the seed radiation.

44. (New) The method of claim 36, further comprising identifying the sample based on the detected inelastically scattered radiation of the plurality of molecules.

45. (New) The method of claim 36, wherein the reflector and partial reflector are opposite and parallel to one another within the chamber and centered along a common optical axis.

46. (New) The method of claim 36, wherein the reflector and partial reflector are separated by a predetermined distance that is proportional to a wavelength of radiation to be resonated in the chamber.

47. (New) The method of claim 46, wherein the predetermined distance provides a nondestructive relationship between the phases of incident and reflected radiation.

48. (New) The method of claim 36, wherein the reflector and the partial reflector are multi-layer dielectric mirrors.

49. (New) The method of claim 48, wherein the multi-layer dielectric mirrors contain a layer having a thickness that is based on a wavelength of the inelastically scattered radiation for the molecule of interest.

50. (New) The method of claim 36, wherein the partial reflector has a sufficient reflectivity to achieve resonance and a sufficient transmittance for the amplified inelastically scattered radiation.

51. (New) The method of claim 36, wherein the resonance chamber includes at least one window to transmit radiation into the resonance chamber and to transmit the amplified inelastically scattered radiation out of the resonance chamber.

52. (New) The method of claim 36, wherein the partial reflector contains at least one window.

53. (New) A method comprising:

a) irradiating in two directions a sample containing a plurality of target molecules of interest in a resonance chamber having a plurality of reflectors within the chamber to reflect radiation;

b) selectively resonating inelastically scattered radiation of a first target molecule between the plurality of reflectors;

c) selectively resonating inelastically scattered radiation of a second target molecule between the plurality of reflectors;

d) transmitting the amplified inelastically scattered radiation of the first and second target molecules from the chamber through an outlet window;

e) detecting the transmitted amplified inelastically scattered radiation of the first and second target molecules; and

f) optionally repeating c), d) and e) for additional target molecules in the plurality of molecules.

54. (New) The method of claim 53, wherein irradiating in two directions includes a seed radiation in a first direction and a transverse radiation in a second direction, the first direction being perpendicular to the second direction.

55. (New) The method of claim 54, wherein the seed radiation and transverse radiation are different frequencies.

56. (New) The method of claim 54, wherein detecting the transmitted amplified inelastically scattered radiation includes detecting a gain over the intensity of the seed radiation.

57. (New) The method of claim 53, further comprising identifying the sample based on the detected inelastically scattered radiation of the target molecules.

58. (New) The method of claim 53, wherein the plurality of reflectors are separated by a distance, the distance being a predetermined distance that is proportional to a wavelength of radiation to be resonated in the resonance chamber.

59. (New) The method of claim 58, wherein the predetermined distance provides a nondestructive relationship between the phases of incident and reflected radiation.

60. (New) The method of claim 53, wherein the plurality of reflectors are multi-layer dielectric mirrors.

61. (New) The method of claim 60, wherein the multi-layer dielectric mirrors contain a layer having a thickness that is based on a wavelength of the inelastically scattered radiation for the molecule of interest.

62. (New) The method of claim 53, wherein the outlet window is in a partial reflector that has a sufficient reflectivity to achieve resonance and a sufficient transmittance for the amplified inelastically scattered radiation.